This Page Is Inserted by IFW Operations and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents will not correct images, please do not report the images to the Image Problem Mailbox.

PCT

(30) Priority Data:

9300773

WORLD INTELLECTUAL PROPERTY ORGANIZATION International Bureau



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁵ :		(11) International Publication Number	r: WO 94/26101
A01K 79/02, 73/02	A1	(43) International Publication Date:	24 November 1994 (24.11.94)

(81) Designated States: AU, CA, CN, JP, KR, NO, US, European PCT/NL94/00086 (21) International Application Number: MC, NL, PT, SE). 21 April 1994 (21.04.94) (22) International Filing Date:

NL

(71)(72) Applicant and Inventor: VERBURG, Leendert, Abraham [NL/NL]; Havenstraat 11, NL-4486 AA Colijnsplaat (NL).

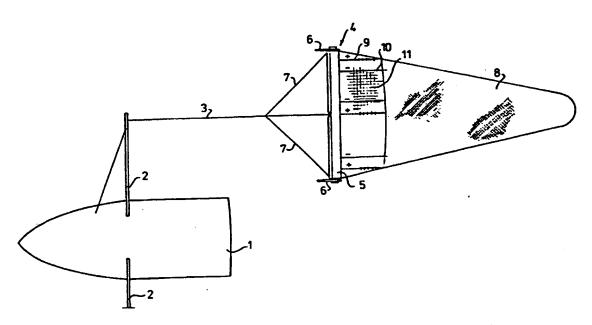
6 May 1993 (06.05.93)

(74) Agent: DE BRUIJN, Leendert, C.; Nederlandsch Octrooibureau, Scheveningseweg 82, P.O. Box 29720, NL-2505 LS The Hague (NL).

patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU,

Published With international search report.

(54) Title: FISHING GEAR FOR ELECTRIC FISHING



(57) Abstract

Fishing gear for electric fishing, comprising a beam (5) which is provided with pairs of electrodes (9, 10) over which a potential difference can be generated, as well as a power source (16) and pulse generator. The power source (16), the pulse generator and th connections for the electrodes (9, 10) are housed in a watertight chamber inside the beam (5), the pulse generator being housed in a chamber which for cooling purposes is partly flushed by water. The electrodes (9, 10) are also each provided with a core (42) of electrically conducting material, metal electrode pieces (43) being electrically connected to said core (42) with regular spacings between them and said core being insulated between the electrode pieces (43).

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	GB	United Kingdom	MR	Mauritania
ΑÜ	Australia	GE	Georgia	MW	Malawi ·
BB	Barbedos	GN	Guinea	NE	Niger
BE	Belgium	GR	Greece	NL	Netherlands
BF	Burkina Faso	HU	Hungary	NO	Norway
BG	Bulgaria	IB	Ireland	NZ	New Zealand
BJ	Benin	П	Italy	PL	Poland
BR	Brazil	JP	Japan	PT	Portugal
BY	Belarus	KE	Keuya	RO	Romania
CA	Canada	KG	Kyrgystan	RU	Russian Federation
CF	Central African Republic	KP	Democratic People's Republic	SD	Sudan
CG	Congo		of Korea	SE	Sweden
CH	Switzerland	KR	Republic of Korea	SI	Slovenia
Œ	Côte d'Ivoire	KZ	Kazakhstan	SK	Slovakia
CM	Cameroon	<u>u</u>	Liechtenstein	SN	Senegal
CN	China	LK	Sri Lanka	TD	Chad
CS CS	Czechosiovakia	LU	Lixenbourg	TG	Togo
cz	Czech Republic	LV	Latvia	TJ	Tajikistan
DE	Germany	MC	Monaco	TT	Trinidad and Tobago
DK	Denmark	MD	Republic of Moldova	UA	Ukraine
ES	Spain	MG	Madagascar	US	United States of America
FI	Finland	ML	Mali	UZ	Uzbekistan
FR	Prance	MN	Mongolia	VN	Viet Nam
GA	Gabon	1121	0		

15

20

25

30

35

Fishing gear for electric fishing

The invention relates to fishing gear for electric fishing, comprising a beam which is provided with pairs of electrodes over which a potential difference can be generated, as well as a power source and pulse generator.

Fishing gear of this type is disclosed in Netherlands Patent Application NL-A-8603257. In the case of this known gear, the power source and voltage generator are housed in one or both box-shaped shoes which are attached to the ends of the beam. However, the space inside a shoe of this type is limited. Moreover, said shoes are also exposed to high stress, for instance when the beam is dragged over a bottom which is uneven. Consequently, it is not easy to guarantee the watertightness of the box and correct functioning of the power source and pulse generator.

The aim of the invention is, therefore, to provide fishing gear of the abovementioned type which both offers a larger space for carrying equipment and also affords better protection. This is achieved in that the power source, the pulse generator and the connections for the electrodes are housed in a watertight chamber inside the beam.

According to the invention the beam is constructed in the form of an elongated box in which there is sufficient room to accommodate all components of the electrical system. Said components are consequently better protected against moisture and knocks than when in the shoes or in separate chambers on the outside of the beam.

Preferably, the pulse generator is housed in a chamber which for cooling purposes is partly flushed by water. The heat which the pulse generator generates during operation can now be dissipated directly to the surrounding water, without the other components becoming overheated. Excellent cooling can be achieved if channels extend through the beam from front to back in the direction the beam is dragged and transverse to its longitudinal direction, which channels delimit the chamber for the pulse generator.

In connection with ease of accessibility of all components, the chamber in the beam is closed at the top by means of a lid.

The beam according to the invention has a larger frontal surface area than the known beam. In order nevertheless to obtain good beam characteristics when dragging over the sea bed, the beam is rounded on the side which is at the front in the direction of drag and has

passages for the electrodes at the back.

The electrodes are attached at their ends distal to the beam to the bottom edge of a trawl-net. The top edge of the trawl-net is attached to the top of the beam in a known manner.

The electrodes are preferably constructed with a core of arbitrarily shaped, conductive material, to which core metal electrode pieces of the desired shape and dimensions are electrically connected with regular spacings between them, whilst the core between the electrode pieces is insulated. Concentrated current pulses, which deliver an 10 excellent excitation pulse, can be emitted using electrodes constructed in this way.

If a rubber sleeve extends between the electrode pieces, the electrodes can be reliably dragged along without becoming caught up behind obstacles.

The invention will now be explained in more detail with 15 reference to an illustrative embodiment shown in the figures.

Figure 1 shows a diagrammatic top view of a fishing vessel, in combination with the fishing gear according to the invention.

Figure 2 shows a side view of part of the fishing gear.

Figure 3 shows a top view of the beam. 20

Figure 4 shows view IV-IV according to Figure 3.

Figure 5 shows view V-V according to Figure 3.

Figure 6 shows a cross-section through the beam on an enlarged scale.

Figure 7 shows an electrode connection. 25

Figure 8 shows a partially cross-sectional view of an example of a streamlined, circular design of a positive electrode.

Figure 9 shows a partially cross-sectional view of an example of a streamlined, circular design of a negative electrode.

Figure 10 shows a partially cross-sectional view of an example 30 of a flat design of a positive electrode.

Figure 11 shows a partially cross-sectional view of an example of a flat design of a negative electrode.

Figure 1 shows a fishing vessel 1, which is provided with two booms 2, on which the fishing gear, which is indicated in its entirety by 35 4. is dragged by means of drag-line 3.

Said fishing gear 4 comprises a beam 5, which is provided at both ends with shoes 6. The drag cable 3 and stabiliser cables 7 are

attached to that side of the beam which is at the front in the direction of drag.

A net 8 as well as positive electrodes 9 and negative electrodes 10 are fitted on that side of the beam 5 which is at the back seen in the direction of drag.

As shown in the side view in Figure 2, the electrodes are dragged over, in or at a certain height above the sea bed. Depending on the type of fish, said electrodes are beneath 9, 10, between, above 9', 10' or on the sides 9'', 10'' of a fairly coarse mesh net 11, which on one side is connected to the beam 5 and on the other side is connected to the lower edge of the net 8. The upper edge of the net 8 is also connected to the beam 5, by means of hauling cables 12.

As can clearly be seen in Figure 2, the shoes 6 are constructed with an upwards-sloping front edge 13, such that said shoes can be pulled easily over obstacles 14. In order to protect the flora on the sea bed, the shoes 6 have wheels or rolling equipment 15, which allows the shoes 6 to ride over the sea bed as they are dragged. The compartments a-b-c-d-e are intended for filling with water for trimming the gear, via pipes 50.

Figure 2 shows the beam 5 in cross-section. The power source 16 and the connection points for the electrodes 9, 10, which connection points are indicated in their entirety by 17, can be seen in the cross-section.

In the top view shown in Figure 3, the beam 5 is shown without the lid. As a result, three chambers can be seen; these are chambers 18 and 19 and chamber 20. Chambers 18 and 19 are delimited by channels 21, 22 and 23, 24 respectively, which widen from the front of the beam 5, where the towing eyes 25 are located, to the back. As can be seen in the front view 4, the chamber 18 is also delimited by a channel 26. Channels 21, 22 and 26 are provided with bars 27, which prevent said channels 21, 30 22 and 26 from becoming blocked.

In the rear view shown in Figure 5 it can be seen that the channels 21, 22 and 26 widen, said widening being towards the rear of the beam 5.

Components which become hot during operation, i.e. the pulse generators (which are not shown in more detail), are housed in the chambers 18, 19. The other components, in particular the power source, are housed in chamber 20. Said power source can be made up of one or more batteries 16. It would also be possible to use other power sources, such

35

as, for example, a gas-generator.

In the enlarged cross-section shown in Figure 6 it can be seen that the chamber 20 is sealed watertight at the top by a lid 28. The power source 16 is housed between rubber blocks 29 and held in place by means of elastic cables 30. Consequently, the batteries 16 are well-protected against shocks.

Above the chamber 20 there is a further watertight chamber 31, where the electrodes 9, 10 are electrically connected by means of the connection devices 32. Said connection devices have a power cable 33, which is also connected to the pulse generators, which are not shown.

Two systems, for venting and storage respectively, in which the gas liberated from the batteries can be stored, are also provided in the beam.

The first system is connected directly to the vent holes of the batteries and comprises a pipe 53 which at one end is connected to said holes and at the other end is connected to a storage chamber 54, which is in the form of bellows.

The second system is connected to the chamber 20 and comprises a storage chamber 56 in the form of bellows.

After the lid of chamber 31 has been opened, the gas which has collected in the bellows-shaped storage chambers 54 and 56 can be discharged by removing the closures 57, 58 and compressing the bellows 45, 56.

By means of these two systems both the batteries 16 themselves
25 and the battery chamber 20 are protected against the risk of explosion
which, if the liberated battery gases were to mix with the air in the
beam, could arise should sparking occur in said beam as a consequence of,
for example, poor electrical contacts.

As yet a further measure in this regard, the battery chamber 20 30 is also filled with nitrogen.

A rupture surface 51 has also been provided in the wall of chamber 20, which rupture surface gives way should an explosion nevertheless occur in said chamber 20. The resulting increase in pressure can then be absorbed in chamber 52. An important feature is that no water is able to penetrate chamber 20 even if rupture surface 51 gives way. The explosion also remains restricted to the space inside the beam.

Figure 7 shows the connection device 32 on a larger scale. Said device comprises a bolt 34, around which two insulating plates 35, 36 are

30

35

fitted. A connection contact 37 is incorporated in the lower insulating plate 36 and a slidable connection contact 38, which is pre-tensioned by spring 39, is incorporated in the upper insulating plate 35. The extent to which connection contact 38 protrudes is determined by the screw thread end 40 and the nut 41 fitted thereon. On turning the nut 41 the upper connection contact 38 moves towards, or away from, the lower connection contact 37. In this way the connection can be made, or broken.

During normal operation of the beam, the nut 41 is unscrewed to such an extent that the upper contact 38 is kept under spring tension in contact with the lower contact 37. For carrying out maintenance work, the nut 41 is screwed down until the contact 38 comes away from contact 37.

Figure 8 shows a positive electrode, which comprises a central, electrically conducting core 42, to which electrode pieces 43 are electrically attached. The electrical connection between the electrode pieces 43 and the core 42 is ensured by means of electrically conducting wires 44, which are fixed to the electrode pieces 43 by means of a connecting bolt 45.

Said core contains not only electrically conducting wires but also a tension cable, which absorbs the tensile forces from the electrode.

A rubber sleeve 46 is fitted between the electrically conducting pieces 43, the outer circumference of said sleeve being identical to that of the electrode pieces 43 in the vicinity of the latter. In the intervening region the rubber sleeve 46 is constricted in order to prevent catching and to improve electrical conduction as the electrode is dragged along. The electrode pieces 43 are also provided with supplementary anchoring in the rubber sleeve 46 by means of stabiliser pins 47.

The negative electrode 10 has electrode pieces 48 which have a fairly long longitudinal dimension. Said electrode pieces 48 are connected to the central electrically conducting core 42 in the same way, by means of connecting bolt 45 and cable 44.

In the alternative embodiment shown in Figures 10 and 11, the el ctrodes have a rectangular cross-section. The electrode pieces are indicated by 60. They are anchored in the flexible rubber material 62 of the electrodes by means of anchors 61.

The electrical connections for the electrodes are indicated by 63.

The electrodes are attached to the cords 64 of a coarse-mesh fishing net. Nylon cords 65 are used for this purpose and clamp the cords 64 of the fishing net to the top of the electrodes. To this end the cords 64 are laid in recesses 66 on the top of the electrodes, whilst the nylon cords are accommodated in a recess 67, which extends over part of the sides and over the top of the electrodes. The nylon cord 65 also extends through a hole 68 in the rubber material of the electrodes.

A positive electrode is shown. Electrode pieces which are of greater width than that shown in Figure 10 are used for a negative 10 electrode.

Claims

- Fishing gear for electric fishing, comprising a beam which
 is provided with pairs of electrodes over which a potential difference
 can be generated, as well as a power source and pulse generator,
 characterised in that the power source, the pulse generator and the
 connections for the electrodes are housed in a watertight chamber inside
 the beam.
- 2. Fishing gear according to Claim 1, wherein the pulse generator is housed in a chamber which for cooling purposes is partly flushed by water.
- 3. Fishing gear according to Claim 2, wherein channels extend
 through the beam from front to back in the direction the beam is dragged
 and transverse to its longitudinal direction, which channels delimit the
 chamber for the pulse generator.
- 4. Fishing gear according to one of the preceding claims,
 20 wherein the chamber in the beam is closed at the top by means of a lid.
 - 5. Fishing gear according to one of the preceding claims, wherein the beam is rounded on the side which is at the front in the direction of drag and has passages for the electrodes at the back.

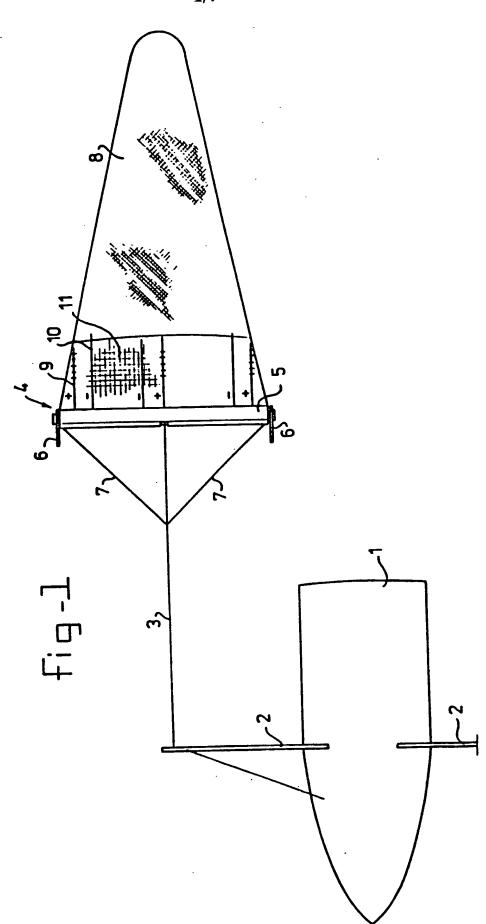
25

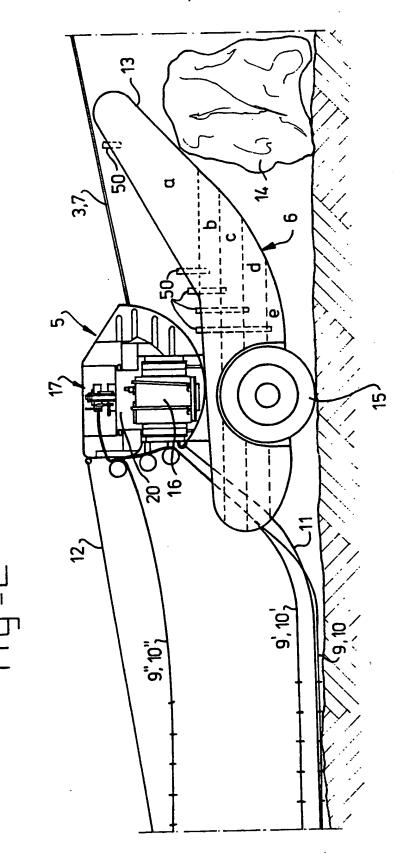
- 6. Fishing gear according to one of the preceding claims, wherein the electrodes are attached at their ends distal to the beam to the bottom edge of a trawl-net.
- 7. Fishing gear according to one of the preceding claims, wherein each electrode comprises a core of electrically conducting material, to which core metal electrode pieces are electrically connected with regular spacings between them, and the core between the electrode pieces is insulated.

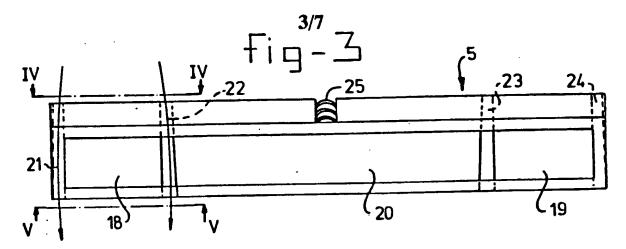
35

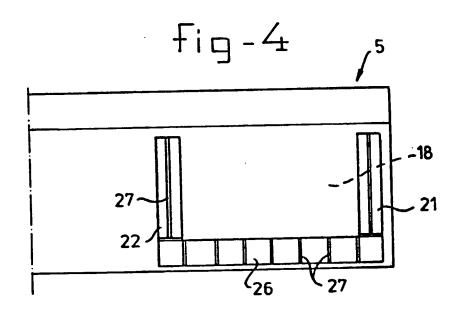
8. Fishing gear according to Claim 7, wherein a rubber sleeve extends between the electrode pieces.

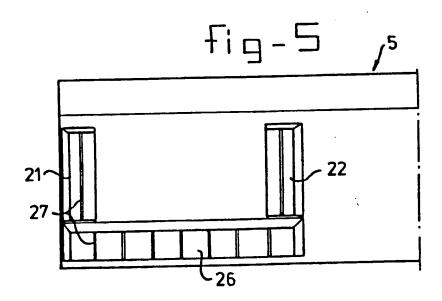
- 9. Fishing gear according to one of the preceding claims. wherein the beam is provided at both ends with shoes having an upwards-sloping front.
- 5 10. Fishing gear according to Claim 9, wherein the shoes are provided with wheels, rolling equipment and/or sliding equipment.
- 11. Fishing gear according to Claim 9 or 10, wherein the shoes are provided with compartments which can individually be filled with water for trimming the gear.

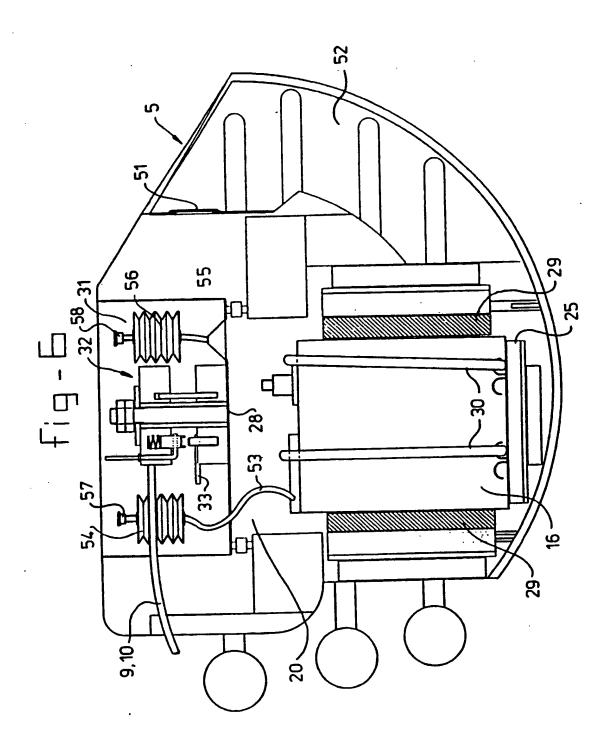


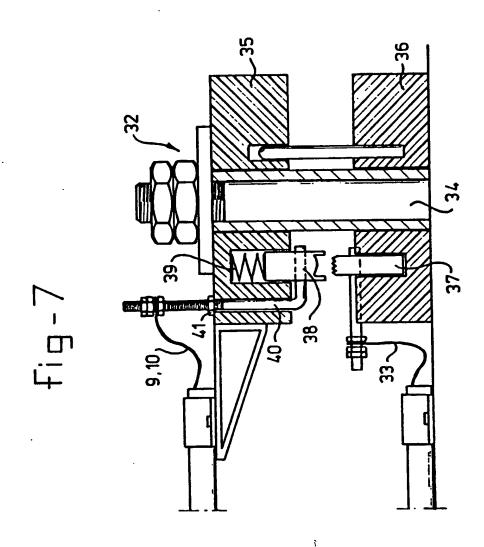


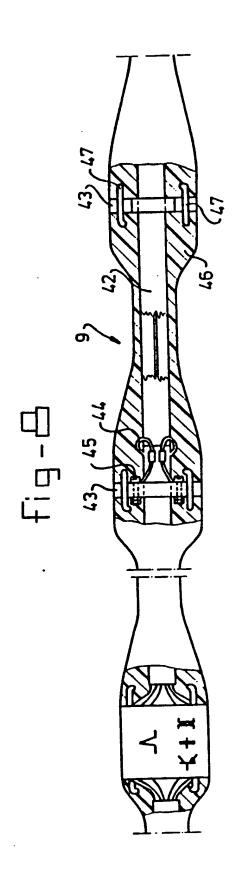


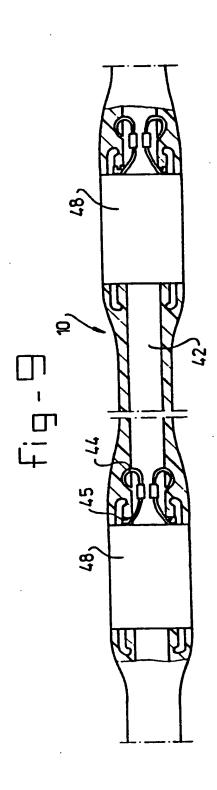


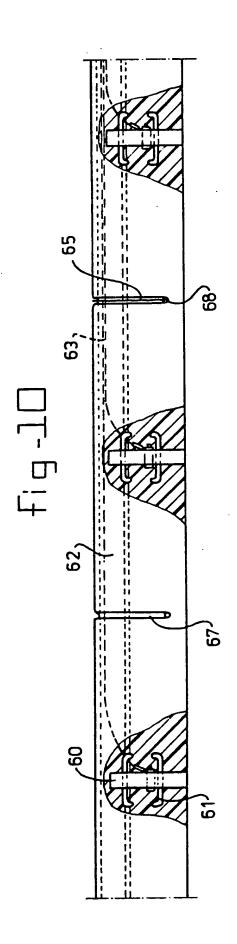


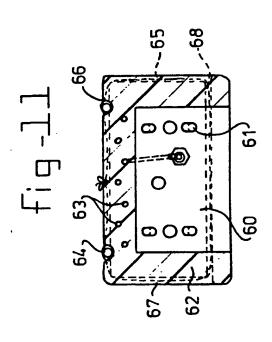












INTERNATIONAL SEARCH REPORT

International application No. PCT/NL 94/00086

			FC1/NL 34/00080
A. CLASSI IPC 5	FICATION OF SUBJECT MATTER A01K79/02 A01K73/02		
	Charles (IDC) and hash national al	carification and IPC	
	o International Patent Classification (IPC) or to both national cl	assincation and IFC	
	SEARCHED ocumentation searched (classification system followed by classification system followed by classif	ication symbols)	
IPC 5	A01K		
Documentat	tion searched other than minimum documentation to the extent t	hat such documents are inc	cluded in the fields searched
Electronic d	lata base consulted during the international search (name of data	hase and, where practical,	, search terms used)
			:
C. DOCUM	MENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the	he relevant passages	Relevant to claim No.
A	NL,A,8 603 257 (LEENDERT) 18 June cited in the application	1988 אוע	
A	US,A,3 777 388 (NEWMAN) 11 Dece	ember 1973	
A	US,A,3 415 001 (OTT) 10 December	er 1968 ·	
A	US,A,3 775 891 (HOLT) 4 December	er 1973	
A	NL,A,8 104 576 (KWAKMAN) 2 May	1983	
Fur	ther documents are listed in the continuation of box C.	X Patent family	y members are listed in annex.
* Special ca	ategories of cited documents:	T later document p	ublished after the international filing date and not in conflict with the application but
'A' docum	nent defining the general state of the art which is not dered to be of particular relevance		and the principle or theory underlying the
	document but published on or after the international	cannot be consid	ticular relevance; the claimed invention dered novel or cannot be considered to
"L" docum	nent which may throw doubts on priority claim(s) or n is cited to establish the publication date of another on or other special reason (as specified)	"Y" document of par	tive step when the document is taken alone ucular relevance; the claimed invention dered to involve an inventive step when the
"O" docum	nent referring to an oral disclosure, use, exhibition or means	document is con	nbined with one or more other such docu- abination being obvious to a person skilled
later	nent published prior to the international filing date but than the priority date claimed	"&" document memb	er of the same patent family
Date of the	e actual completion of the international search	Date of mailing	of the international search report 2. 5. 08.94
- 2	27 July 1994		
Name and	mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NI 2280 HV Rijswijk	Authorized office	a
l '	141 2200 117 141,500 pm	١	

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No. PCT/NL 94/00086

			101/112 31/0000	
Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
NL-A-8603257	18-07-88	NONE		
US-A-3777388	11-12-73	NONE		
US-A-3415001		NONE	,	
US-A-3775891	04-12-73	NONE		
NL-A-8104576	02-05-83	NONE		